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Volume 22, Algorithm Updates for the Fourth SeaWiFS Data Reprocessing

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Chapter 1

Introduction to the Fourth SeaWiFS Reprocessing

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Abstract

The fourth reprocessing of the SeaWiFS global data set in July 2002 was preceded by over two years of data analysis, algorithm development, testing, and evaluation by the SeaWiFS Project. Numerous issues that were known at the time of the third reprocessing were addressed, and solutions were developed. Additional algorithm refinements were proposed during this time. A number of proposed changes were deferred, because they either did not show a clear improvement in data quality, or were not sufficiently well developed to be accepted for operational use. All of the accepted changes were subjected to a rigorous, step-by-step evaluation, and detailed results were made available for review and comment by the scientific community, well in advance of the actual reprocessing. This chapter describes the activities that culminated in the fourth SeaWiFS data reprocessing.

1.1 INTRODUCTION

Throughout the life of the SeaWiFS mission, the NASA SeaWiFS Project, working in close collaboration with members of the ocean color research community, has conducted continual evaluations of the calibration, algorithms, and operational procedures used to process SeaWiFS data. Significant progress has been made in a large number of areas which have not only continuously improved the scientific quality of the SeaWiFS data products since launch, but have also expanded the product suite to include a number of valuable additional products. Some of these products are the Normalized Difference Vegetation Index (NDVI), PAR, and Land Surface Reflectance. Before implementing any changes, however, to the operational products that are archived and distributed by the Goddard Space Flight Center (GSFC) Distributed Active Archive Center (DAAC), the SeaWiFS Project conducts a very comprehensive set of evaluations for each of the proposed changes, and solicits feedback from the scientific community on the validity of the changes and their effects on the derived products.

In July 2002, the SeaWiFS Project completed the most recent round of evaluations and concluded that the improvements justified another reprocessing. To facilitate the exchange of information with as broad a representation of the international ocean color community as possible, a comprehensive Web site was developed that contained all the details of the analyses performed, complete statistical analyses of the results, and a change-by-change accounting for the resulting differences in the derived products. The Web site† contained a summary of the results for each of the detailed incremental tests that were run to assess the effect of each change proposed for the fourth reprocessing of the SeaWiFS global data. These tests were all run for the month of May 1999. The summary for each test included a statement of the changes added for that test, and a brief discussion of the changes in the products that resulted from the test. The discussions included links to text, images, and plots on the Web site which described the changes in detail and illustrated the results. In addition to these detailed tests, additional analyses were performed on the complete SeaWiFS mission period; these results are presented on the Web site as well.

While science is a continuous process, and there will always be additional improvements that can be made as understanding improves, the SeaWiFS Project believes that the results of the most recent evaluations clearly demonstrate that better products are produced today than during the third SeaWiFS reprocessing. This belief was strongly supported by the feedback from the ocean color scientists, who reviewed the posted analyses and performed additional evaluations of their own.

† `http://seawifs.gsfc.nasa.gov/SEAWIFS/RECAL/Repro4`